

Taxonomic remarks on Italian *Cixidia* with description of two new species*

(Insecta, Homoptera, Auchenorrhyncha, Achilidae)

By Vera D'Urso and Adalgisa Guglielmino

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This paper redescribes and illustrates *Cixidia marginicollis* (Spinola, 1839) and recognizes *C. italica* (Wagner, 1959) as its synonym. It describes and illustrates two new species, *C. sikaniae*, spec. nov. from Sicily and *C. pilatoi*, spec. nov. from the Italian peninsula. The distinctiveness of the three species is based on the general appearance, the colour pattern, and the shape of vertex, frons, pronotum, pygofer structure, anal tube, aedeagus of ♂♂ and VII abdominal sternite of ♀♀.

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Introduction

The achilid genus *Cixidia* Fieber, 1866 is considered difficult and one that is in need of revision. At present 12 species have been reported in the Palaearctic region. Two species are present in the Maritime Territory of Russia: *C. kaspanyani* Anufriev, 1983 and *C. ussuriensis* (Kusnezov, 1928); one in Japan: *C. okunii* (Matsumura, 1914); one in North Europe: *C. confinis* (Zetterstedt, 1828); one in Central-North Europe and Siberian Asia: *C. lapponica* (Zetterstedt, 1840); one from the areas of South Europe to the Turanic region: *C. parnassia* (Stål, 1858). Six species are found round the Mediterranean Sea: *C. advena* (Spinola, 1839) is a North Mediterranean species; *C. genei* (Spinola, 1839) is a West Mediterranean species; *C. italica* (Wagner, 1959) is an Italian species from Campania and Sicily; *C. marginicollis* (Spinola, 1839) is a Central-South European-Mediterranean species; *C. maroccana* Anufriev, 1969 is endemic to Morocco; *C. mersinica* (Dlabola, 1987) is endemic to Anatolia.

This paper redescribes *C. marginicollis* and reviews the Italian species of *Cixidia* related to it. *C. marginicollis* was described by Spinola (1839) from material from Sicily as *Elidiptera marginicollis*. He illustrated the general appearance of the body, head and face. Metcalf (1948) placed this species in the genus *Epiptera* Metcalf. Anufriev (1969) redescribed the species and illustrated the ♂ genitalia without having seen the holotype, basing his description on specimens from Moldavia. Moreover, he stated that the genus *Epiptera* Metcalf, 1922 was a synonym of *Cixidia* Fieber, 1866. Following Anufriev's paper, Logvinenko (1975) and Dlabola (1987) based their identification of *C. marginicollis* on his redescription.

In 1959 Wagner described *Epiptera italica* from specimens collected on Mount Etna and reported a ♀ of the same species in Campania.

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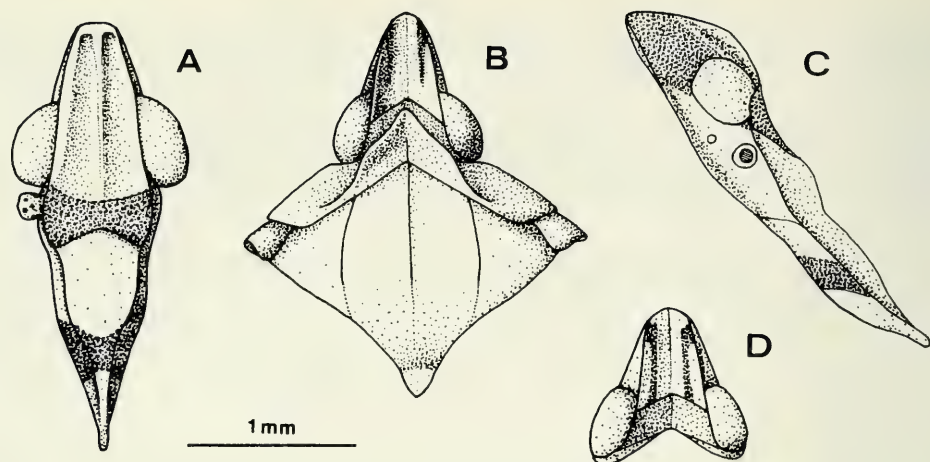


Fig. 1. *Cixidia marginicollis* (Spinola). ♂ holotype (Sicily). A. Face; C. head, lateral view; D. head, dorsal view. B. ♂ (Sicily, C. da Paviglione). Head and thorax, dorsal view.

We have compared the holotypes of *C. marginicollis* and *C. italica*. They did not show any significant differences, thus *C. italica* (Wagner, 1959) should be considered as a synonym of *C. marginicollis* (Spinola, 1839).

In the light of this new synonymy, the critical reevaluation of the bibliographic information on *C. marginicollis* and the direct examination of our specimens and others we have been seen, allow us to state that: 1. a new species, *Cixidia sikaniae*, is present on Mt Etna (Sicily) in addition to *C. marginicollis*. The former can be easily distinguished by the shape and colour of the face and vertex, and the male and female genital morphology; 2. the specimens from peninsular Italy belong to a new species, *Cixidia pilato*. It can be readily identified by the external morphology and both male and female genitalia; 3. the descriptions and figures of non-Italian specimens of *C. marginicollis* published by Anufriev (1969), Logvinenko (1975), and Dlabola (1987), cannot be attributed to this species, but to one or more taxa which have not been defined as yet. They resemble *C. pilato* very closely but direct examination is required before they can be assigned to this or other species. Confirmation of all records of *C. marginicollis* outside Italy is required since none of the authors have given illustrations that allow certain identification.

Abbreviations of museums, institutions and collections where the material examined is deposited: DG: D'Urso and Guglielmino's collection, Catania; IZ: Istituto di Zoologia, Sezione Museo, Entomologia, Roma; MCSN: Servadei's collection c/o Museo Civico di Storia Naturale, Verona; MCZ: Luigi's collection c/o Museo Civico di Zoologia, Roma; MRSN: Spinola's collection c/o Museo Regionale di Scienze Naturali, Torino; ZSM: Zoologische Staatssammlung, München.

Cixidia marginicollis (Spinola, 1839)

(Figs 1-6)

Elidiptera marginicollis Spinola, 1839: 309.

Epiptera italica Wagner, 1959: 70-72 (D'Urso & Guglielmino, 1993: 18).

Types. Holotype: ♂, Sicily, D. Grohmann, *Elidiptera marginicollis* Spin. (MRSN). - Italy, Sicily, 1♂, 1♀, Mt. Etna: Ragala (Pedara), 800 m, 2.6.49, leg. Hartig, det. Wagner as *Epiptera italica*, on *Quercus cerris*, (IZ); 14♂♂, 17♀♀, Mt. Etna: Contrada Paviglione (Maletto), 1200 m, U.T.M. VB 9183, 16.6.92, leg. D'Urso, Guglielmino; 9♂♂, 1♀, 3.7.92, leg. D'Urso, Guglielmino; 3♂♂, 3♀♀, 20.7.92, leg. D'Urso, Guglielmino; 1♂, 2♀♀, 20.10.92, leg. D'Urso, Guglielmino; 1♂, 1♀, 14.7.93, leg. D'Urso, Guglielmino; on *Pinus pinaster*, *Quercus* gr. *pubescens*, *Q. ilex*, (DG, ZSM); 2♂♂, Mt. Etna: Contrada Giarrita (S. Alfio), 1350 m, U.T.M. WB 0880, 15.7.92, leg. D'Urso, on *Quercus cerris* (DG).

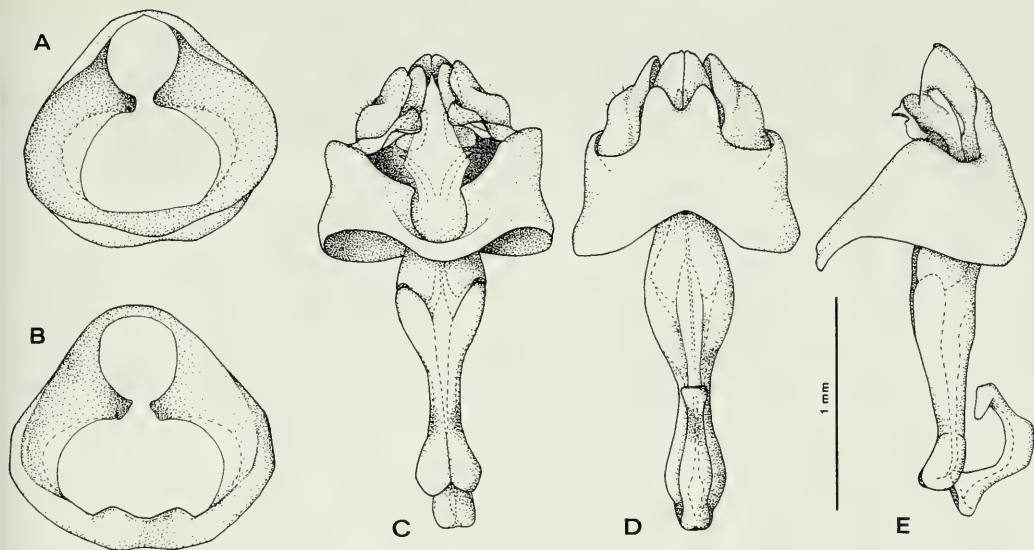


Fig. 2. *Cixidia marginicollis* (Spinola). ♂ holotype. A-B. Pygofer. A. Anterior, B. posterior view; C-E. Genital block. C. Dorsal, D. ventral, E. lateral view.

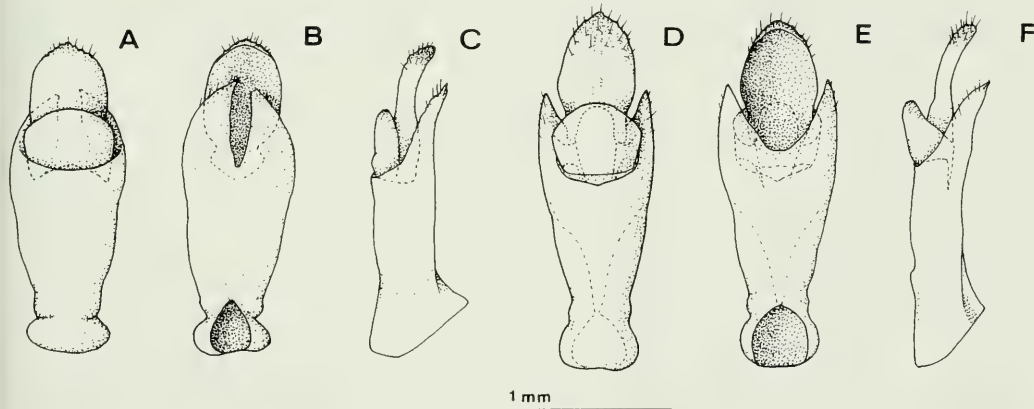


Fig. 3. *Cixidia marginicollis* (Spinola). ♂ holotype. A-C. Anal tube. A. Dorsal, B. ventral, C. lateral view. D-F. ♂ (Sicily, C. da Paviglione). D-F. Anal tube. D. Dorsal, E. ventral, F. lateral view.

Description

Measurements. Males. Total body length (including tegmina): 6.16-7.80 mm; length of vertex: 0.45-0.52 mm; width of vertex: 0.38-0.45 mm; width of head: 0.77-0.92 mm; length of pronotum: 0.32-0.37 mm; width of pronotum: 1.47-1.82 mm; length of mesonotum: 1.22-1.47 mm; width of mesonotum (including tegulae): 1.77-2.17 mm. - Females. Total body length (including tegmina): 8.60-9.90 mm; length of vertex: 0.55-0.67 mm; width of vertex: 0.45-0.65 mm; width of head: 0.92-1.12 mm; length of pronotum: 0.38-0.50 mm; width of pronotum: 1.87-2.07 mm; length of mesonotum: 1.50-1.65 mm; width of mesonotum (including tegulae): 2.20-2.25 mm.

Body rather flattened. All specimens observed macropterous. Fore wings much longer than the abdomen and as long as the hind wings. Both sexes dark brownish black, mottled with yellow specks.

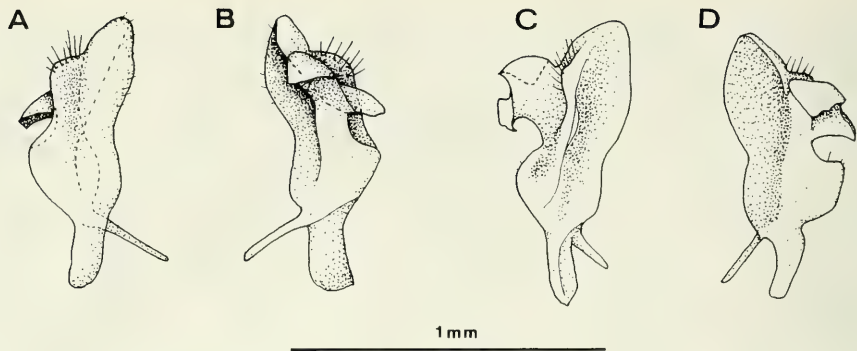


Fig. 4. *Cixidia marginicollis* (Spinola). ♂ holotype. A-D. Left stylus. A. Ventral, B. dorsal, C. lateral, D. inner view.

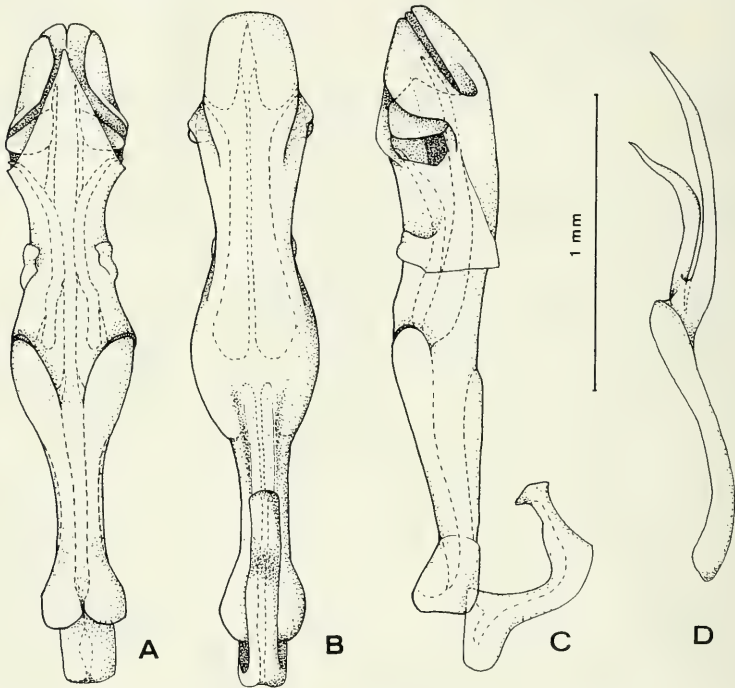


Fig. 5. *Cixidia marginicollis* (Spinola). ♂ holotype. A-C. Aedeagus. A. Dorsal, B. ventral, C. lateral view. D. ♂ (Sicily, C. da Paviglione). Penis left rod, lateral view.

Vertex (Figs 1B-D) trapezoidal, its median length greater than the width on the level of the eyes; parabolic anterior margin and distinctly carinated lateral elevated margins making the vertex markedly concave; longitudinal medial ridge indistinct. Frons (Figs 1A,C) elongated, forming an acute angle with the vertex; widest in the third basal and slightly narrowed near the eyes. Its lateral margins carinated with a longitudinal medial carina originating just below the frons apex. This carina very distinct in the upper half (wide, jutting out and rounded at its source), becoming gradually less evident and disappearing near the basal margin. Clypeus (Fig. 1A) with carinated lateral margins which are less pronounced than those on frons. In lateral view, head (Fig. 1C) narrow and very elongated. Ocelli small, situated about half way between the eyes and the lateral margin of frons.

Pronotum (Fig. 1B) short and wide with carinated margins. Median portion protruding anteriorly, subtriangular, narrow with rounded apex. Median carina evident in the posterior $\frac{3}{4}$. Lateral carinae prominent, arcuate, diverging, and bent laterally, not reaching the posterior margin of pronotum.

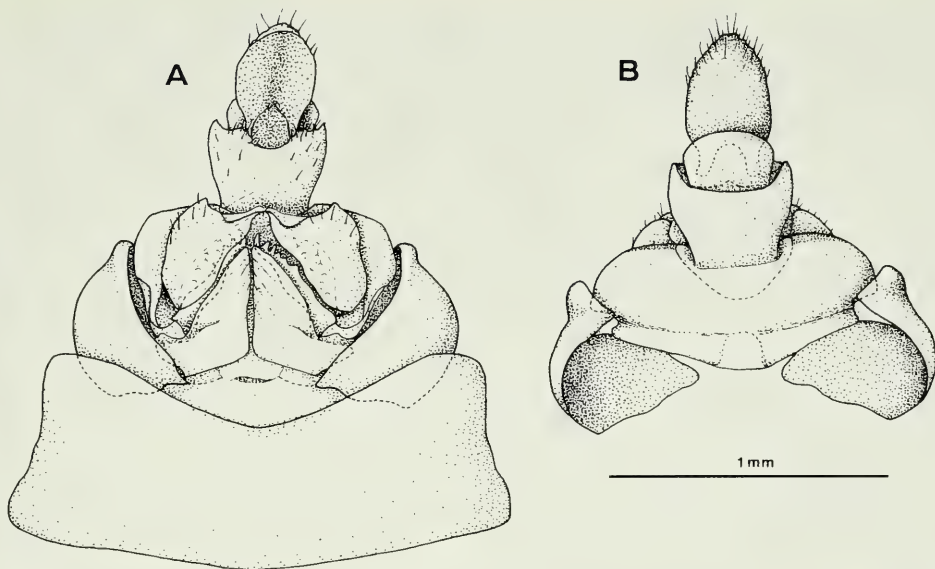


Fig. 6. *Cixidia marginicollis* (Spinola). ♀ (Sicily, C. da Paviglione). A-B. Genital block. A. Ventral, B. dorsal view.

Mesonotum (Fig. 1B) broad, slightly concave in the third portion between the lateral carinae; median carina distinct only in the anterior $\frac{2}{3}$ and smoothing out caudally. Lateral carinae slightly arcuate with convexity directed towards the exterior, evident in the anterior and just perceptible in the posterior half.

Head yellowish with dark brown, almost black bands (Figs 1A-D). A broad transversal band running along the base of the frons; another band present at the base of the postclypeus and extending laterally over the whole width of the lorae. A third band extending to the edges of the head; as broad as the eye, originating at the apex of the head, reaching the eye and then extending onto the pronotal laterodorsal and lateroventral portions (where it is very wide), and until the tegula. Vertex presenting two dark brown longitudinal stripes which merge anteriorly with the lateral face bands, sometimes reaching the posterior margin. Pronotum mainly yellowish with some brown dorsal mottling in addition to the previously described lateral bands. Mesonotum brown and densely spotted with yellow between the lateral carinae, while mottled in the lateral portions. Posterior mesonotal extremity yellow, with a yellow spot on the distal end of each lateral carina.

Fore wings with few accessory transverse veins in the apical portion of the corium, brown flecked with yellow; the same colour present on the nerves which become progressively yellowish towards the corial apex. One yellow spot on the claval apex. Hind wing membrane and veins uniformly darkish brown. Legs uniformly brownish. Abdominal segments brown dorsally and yellowish-brown ventrally; with a more or less broad pale border.

♂ genitalia. Pygofer ring-shaped (Figs 2A-E). In dorsal view (Fig. 2C) its posterior margin with a deep medial elliptical notch, varying in width, extending almost to the anterior margin. This notch in articular contact with the anal tube. Anterior margin prominent and very convex at this notch. Ventrally (Fig. 2D), pygofer with a prominent, subrectangular median lobe; at the distal extremity markedly forked with rounded apices. Anterior margin of the pygofer with a medial, obtuse-angled notch. Anal tube (Figs 3A-F) slightly flattened, long and thin, narrowing immediately after the base and then gradually broadening towards the apex, with protruding and pointed posterolateral angles; ventral surface without swelling. Styli (Figs 4A-D) very complex, principally composed of a vaguely ellipsoidal, medially very concave portion with a characteristic convoluted extroflexion that arises from about halfway of the dorsal margin. Their proximal extremity divided in two diverging branches, the medial one being thinner and the lateral stronger and shorter.

Aedeagus complex, as in all Achilidae; following Anufriev's nomenclature (1969), made up of a periandrium with lobes (two ventral, two lateral, one dorsal) and a penis proper (made of symmetrical

rods) contained within the periandrium. In *C. marginicollis*, aedeagus (Figs 5A-C) slender with two narrowings. Lateral lobes subtrapezoidal, with a narrow base; just shorter than the ventral ones and well sclerified; a markedly swollen, sclerified mammillary process originating from their internal surface. Ventral lobes broad and fused medially, forming an elongated rectangular plate; but not fused in the apical portion where they each present distinctly rounded extremities. Ventral lobes strongly sclerified. Periandrial dorsal lobe flattened, slightly sclerified, triangular in shape with a pointed apex, and shorter than the lateral lobes. Two sclerified lateral bands on the periandrial wall at the distal narrowing; the dorsal portion of each band forming a very sclerified articular process by means of which the aedeagus articulates dorsally with the posterodorsal angles of the pygofer. Laterally and ventrally with a membrane connecting the periandrium with the pygofer walls and styli at the level of the two longitudinal bands. Styli joined and connected with the pygofer by means of a membranous septum perpendicular to the main aedeagal axis dividing the pygofer into anterior and posterior chambers. Each rod of penis proper (Fig. 5D) markedly sclerified and divided in two branches with pointed extremities, with the ventral branch longer than the dorsal, prolonged posteriorly and only the dorsal tip slightly bent dorsally. The dorsal branch strongly bent dorsally and externally. The genital block dark brown, with more or less widespread yellow areas along the posterior margin of the pygofer, especially in the ventral portion and in some areas of the styli.

♀ genitalia (Figs 6A-B). Seventh abdominal sternum subrectangular with rounded posterior angles, posteriorly with a wide, shallow medial notch. Valvifer VIII very convex, semicupped in shape. Main portion of gonapophyse VIII conspicuously sclerified, with half a dozen teeth which become longer and stronger towards the apex. Genital block more or less deep brown.

Geographical distribution. At present the species has been recorded with certainty only in Sicily. In a description of *C. italica*, Wagner reports a ♀ collected in Campania shown to him by Linnavuori. We have not been able to examine this specimen and although Wagner's description is probably correct, the presence of *C. marginicollis* in peninsular Italy requires further confirmation. However, all records of *C. marginicollis* from the Italian peninsula reported in Servadei's catalogue (1967) are *C. pilatoi*. Confirmation is needed for all records outside the Italian peninsula.

Biological and ecological remarks. Adults, larvae and nymphs were collected on Mt Etna under the bark of felled trunks of *Pinus pinaster*, *Quercus* gr. *pubescens*, *Q. cerris*, and *Q. ilex*, in presence of hypha of club fungi (*Trichaptum fusco-violaceum* (Ehrenb. ex Fr.) Ryv. on *Pinus*). Eggs are laid in this environment in the summer and larvae hatch in summer and at the beginning of autumn (end of September-October). They overwinter mainly as 3rd and 4th instar nymphs. *C. marginicollis* cohabitates with *C. sikaniae*.

Cixidia sikaniae, spec.nov.

(Figs 7-12)

Types. Holotype: ♂, Italy, Sicily, Mt. Etna: Contrada Paviglione (Maletto), 1200 m, U.T.M. VB 9183, 3.7.92, leg. D'Urso, Guglielmino (DG). - Allotype: 1 ♀, same data (DG). - Paratypes: 19 ♂♂, 13 ♀♀, same data; 14 ♂♂, 13 ♀♀, 16.6.92, leg. D'Urso, Guglielmino; 3 ♂♂, 3 ♀♀, 20.7.92, leg. D'Urso, Guglielmino; 4 ♂♂, 3 ♀♀, 14.7.93, leg. D'Urso, Guglielmino; on *Pinus pinaster*, *Quercus* gr. *pubescens*, *Q. ilex* (DG and ZSM); 1 ♀, Italy, Sicily, Mt. Etna: Pineta versante occidentale, 1700 m, 13.8.1949, leg. Hartig, det. Wagner as *Epiptera* sp. (IZ).

Description

Measurements. Males. Total body length (including tegmina): 9.06-10.30 mm; length of vertex: 0.65-0.70 mm; width of vertex: 0.65-0.72 mm; width of head: 1.12-1.30 mm; length of pronotum: 0.50-0.55 mm; width of pronotum: 1.97-2.17 mm; length of mesonotum: 1.62-1.85 mm; width of mesonotum (including tegulae): 2.20-2.47 mm. - Females. Total body length (including tegmina): 10.40-11.40 mm; length of vertex: 0.70-0.75 mm; width of vertex: 0.70-0.80 mm; width of head: 1.25-1.35 mm; length of pronotum: 0.55-0.60 mm; width of pronotum: 2.22-2.50 mm; length of mesonotum: 1.77-2.00 mm; width of mesonotum (including tegulae): 2.37-2.75 mm.

Body similar to *C. marginicollis* but larger and thinner. Greyish-brown in colour with light yellow speckled markings.

Vertex (Fig. 7B) trapezoidal, as broad as long or little broader than long; its anterior margin parabolic,

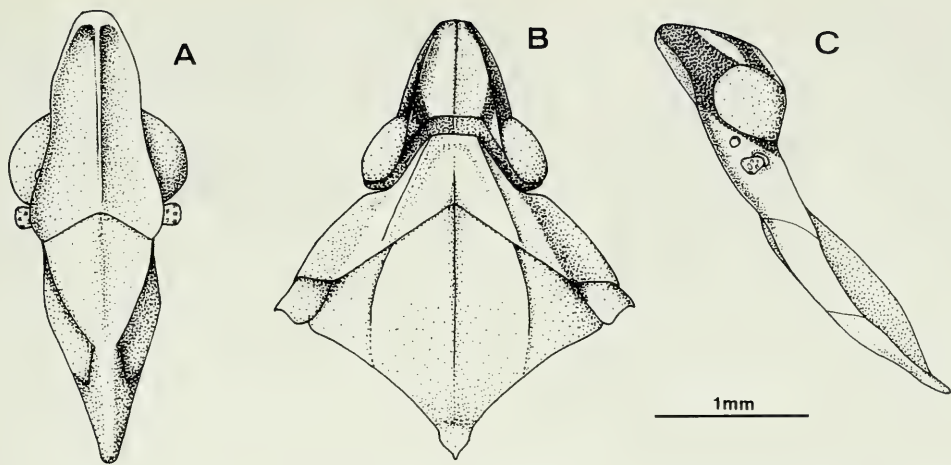


Fig. 7. *Cixidia sikaniae*, spec. nov. ♂ holotype (Sicily, C. da Paviglione). A. Face; B. head and thorax, dorsal view; C. head, lateral view.

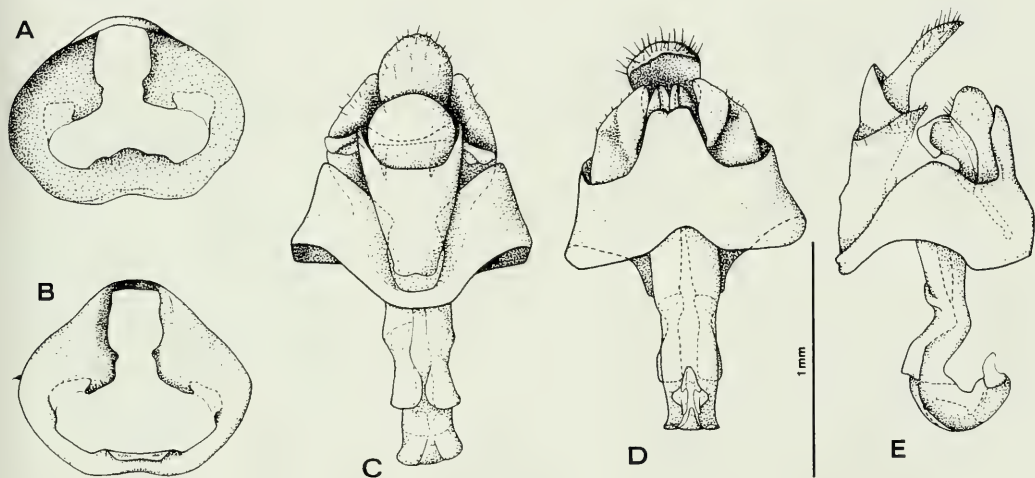


Fig. 8. *Cixidia sikaniae*, spec. nov. ♂ holotype. A-B. Pygofer. A. Anterior, B. posterior view. C-E. Genital block. C. Dorsal, D. ventral, E. lateral view.

and carinated lateral margins elevated dorsally towards the base. Vertex narrower and less concave than observed in *C. marginicollis*, with marked longitudinal medial groove. Prolonged frons (Fig. 7A) as in *C. marginicollis*, but less narrow and tapered, slightly dilated near the apical portion. Medial carina thinner and sharper along the total length of the frons. Clypeus with an almost imperceptible longitudinal medial carina. In lateral view (Fig. 7C) head narrow, lateral margin of frons between the eye and head apex slightly concave. Large ocelli nearer to the eye than to the frons lateral margin.

Protruding medial portion of pronotum (Fig. 7B) broad, trapezoidal in shape with straight anterior margin. Medial carina evident in the posterior $\frac{3}{4}$; lateral carinae almost straight, somewhat diverging posteriorly, not reaching the posterior margin.

Mesonotum (Fig. 7B) substantially resembling *C. marginicollis*, but more pointed posteriorly, with more arcuate lateral carinae.

Head more or less darkish yellow, with scattered brown marks (Figs A-C). Frons, clypeus and lorae uniformly yellow ochre. Lateral carinae of frons dark brown, speckled with pale yellow, particularly in the apical portion, and in the apical portion of the frontal medial carina. Genae and temples pale

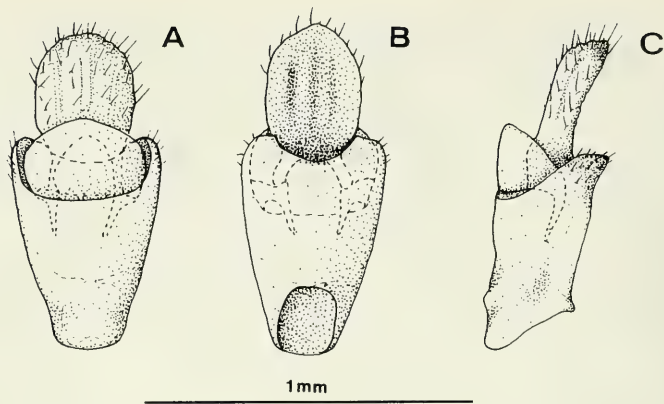


Fig. 9. *Cixidia sikaniae*, spec. nov. ♂ holotype. A-C. Anal tube. A. Dorsal, B. ventral, C. lateral view.

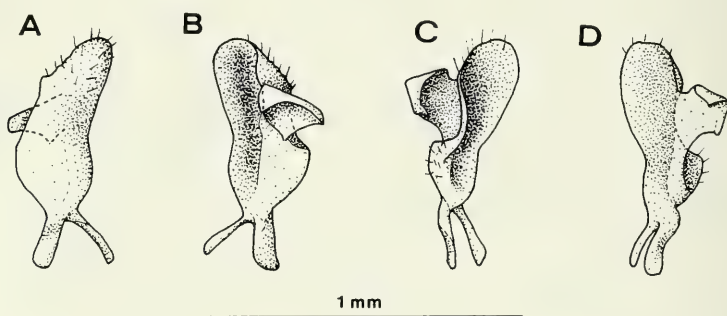


Fig. 10. *Cixidia sikaniae*, spec. nov. ♂ holotype. A-D. Left stylus. A. Ventral, B. dorsal, C. lateral, D. inner view.

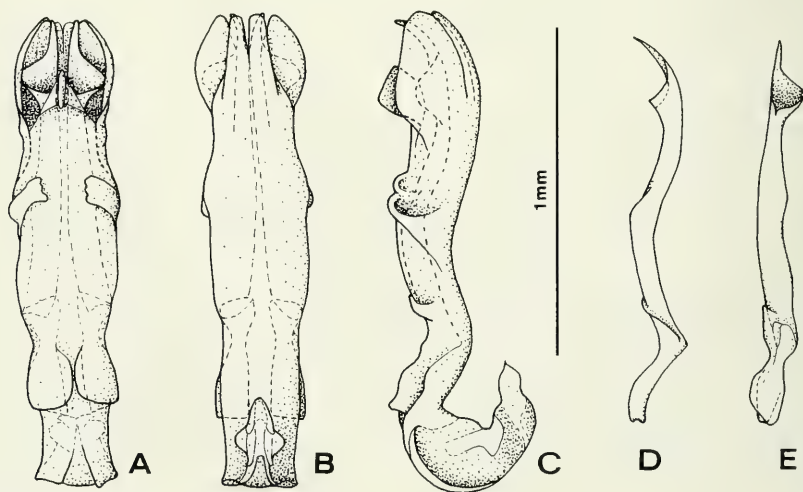


Fig. 11. *Cixidia sikaniae*, spec. nov. ♂ holotype. A-C. Aedeagus. A. Dorsal, B. ventral, C. lateral view. ♂ paratype (Sicily, C. da Paviglione). D-E. Penis left rod. D. Lateral, E. dorsal view.

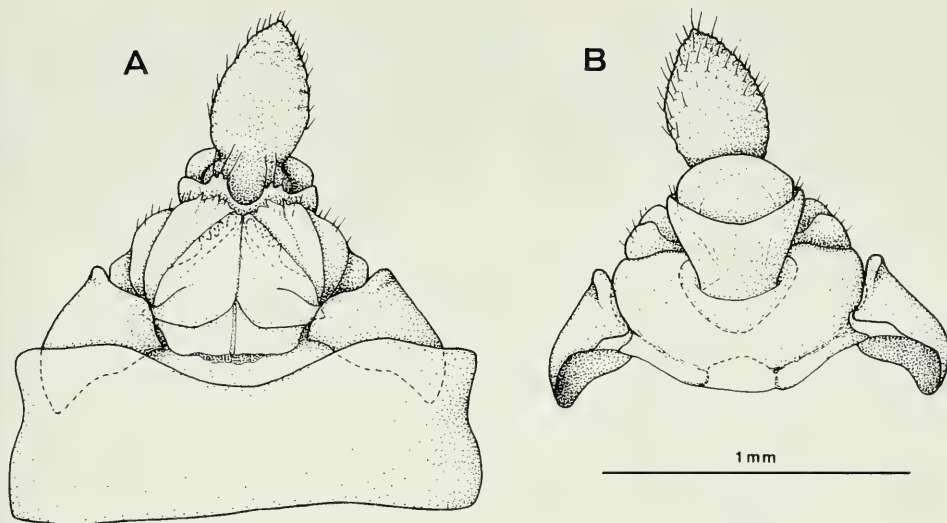


Fig. 12. *Cixidia sikaniae*, spec. nov. ♀ allotype (Sicily, C. da Paviglione). A-B. Genital block. A. Ventral, B. dorsal view.

yellow. On each side of head, a dark brown band with rare yellow spots that is just narrower than the eye diameter, stemming from the apex of the head (sometimes overlapping into the vertex), reaching the posterior extremity of the head, and running along the lateroventral portions of the pronotum and of the tegula. Another much narrower, parallel band (always absent in *C. marginicollis*) originating about halfway the lateral margin of the vertex and reaching the eye. Lateral carina of vertex presenting two narrow, longitudinal bands which are in continuation with each of the two narrower bands on the side of the face; these bands reaching the posterior margin.

Pronotum brown and totally mottled with yellow, its lateroventral margin pale yellow with previously described broad, dark bands. Colouring of mesonotum similar, with indistinct yellowish marks on the posterior part and on the distal extremities of the lateral carinae.

Fore wings thinner than in *C. marginicollis*, with a higher number of accessory transverse veins on the corium. Their brown colouring less intense than in *C. marginicollis* with very large merging yellowish spots; but more uniformly brown at the apex. As in *C. marginicollis*, the apical veins becoming paler distally, and bearing a yellow spot on the claval apex. The more external subapical cells generally with 1-2 brown spots, the more external apical cells with a dark brown border. Hind wings with a light brown membrane bearing slightly darker veins.

Legs uniformly ochre; colour of abdomen as in *C. marginicollis*.

♂ genitalia. Genital block (Figs 8A-E) substantially smaller than in, and pygofer rather similar to, *C. marginicollis*. In dorsal view (Fig. 8C) lateral pygofer margins almost straight, tending to converge posteriorly, and anterior margin more angular than in *C. marginicollis*. Ventral medial lobe (Fig. 8D) subtrapezoidal with faintly notched distal extremity. Anterior margin median notch narrower and more rounded than in *C. marginicollis*. Large, broad stunted anal tube (Figs 9A-C) without narrowing just after the base. Somewhat protruding, rather rounded posterolateral angles. Styli (Figs 10A-D) resembling those of *C. marginicollis*, but with narrower ellipsoidal portions and a more rounded posterior edge. Aedeagus (Figs 11A-C) short, stunted and less sclerified than in *C. marginicollis*. In dorsal view, of almost the same width along its entire length. Lateral lobes uniformly concave medially, as long as the ventral ones, subtrapezoidal in shape and with a larger base than in *C. marginicollis*. Ventral lobes narrow with rounded distal extremity, fused only at the base. Dorsal lobe short and very narrow, extending to the sagittal plane; in lateral view nearly quadrangular, rather axe-like in shape and very sclerified. No processes present between the dorsal and lateral lobes; aedeagus connected to the pygofer and styli as in *C. marginicollis*. Penis rods (Figs 11D-E) not forked as in *C. marginicollis*, but with a spoon-shaped distal portion prolonged medially in a narrow, pointed protrusion. Genital block uniformly light brown.

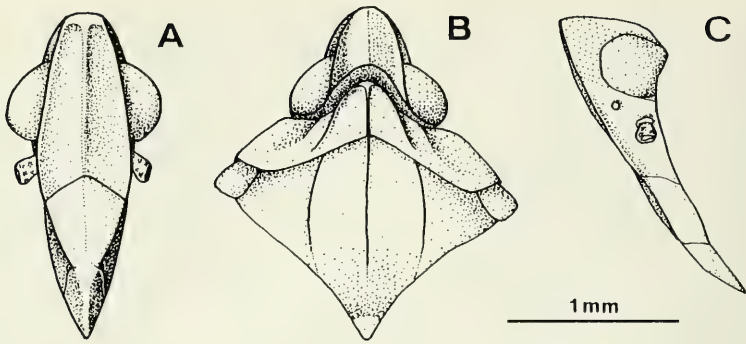


Fig. 13. *Cixidia pilatoi*, spec. nov. ♂ holotype (Calabria, Camigliatello). A. Face; B. head and thorax, dorsal view; C. head, lateral view.

♀ genitalia (Figs 12A-B). Genital block smaller than in *C. marginicollis*, with the notch on posterior margin of the VIII abdominal segment confined to the medial portion. In addition, the gonapophysis VIII differing from *C. marginicollis* in its lower number of sclerified teeth which are all of about the same size and shape.

Geographical distribution. At present, the species is known only from Mt Etna (Sicily).

Biological and ecological remarks. The biological and ecological cycle of *C. sikaniae* resembles that of *C. marginicollis* with which it was found living together.

Derivatio nominis. "Sikania" is the ancient name of Sicily.

Cixidia pilatoi, spec. nov.

(Figs 13-18)

Types. Holotype: ♂, Italy, Calabria: Camigliatello, 23.7.1950, det. Servadei as *Epiptera marginicollis* (MCSN). - Allotype: ♀, Italy, Tuscany: Tombolo, 4.1932, leg. Nicotra, det. Luigioni as *marginicollis* (MCZ). - Paratypes: 1 ♀, Italy, Trentino: Castel Toblino, V. Sarca, 22.7.1963, det. Servadei as *E. marginicollis* (MCSN); 1 ♀, Val Lagarina, Lizzana, 12.7.1951, det. Servadei as *E. marginicollis*, on *Quercus* (MCSN); 1 ♀, Italy, Apulia: Foresta Umbra, 10.7.1955, leg. det. Servadei as *E. marginicollis* (MCSN); 1 ♂, Italy, Abruzzi: Pescasseroli, 23.6.1927, leg. det. Luigioni as *Helicoptera marginicollis* (MCZ); 1 ♂, Italy, Latium: Tuscolo, 5.6.1931, leg. Luigioni, det. Lallemand as *marginicollis* (MCZ).

Description

Measurements. Males. Total body length (including tegmina): 6.66-8.53 mm; length of vertex: 0.35-0.40 mm; width of vertex: 0.47-0.55 mm; width of head: 0.87-1.05 mm; length of pronotum: 0.27-0.30 mm; width of pronotum: 1.60-1.87 mm; length of mesonotum: 1.25-1.55 mm; width of mesonotum (including tegulae): 1.82-2.20 mm. - Females. Total body length (including tegmina): 8.53-9.20 mm; length of vertex: 0.37-0.42 mm; width of vertex: 0.55-0.57 mm; width of head: 1.05-1.12 mm; length of pronotum: 0.32-0.35 mm; width of pronotum: 1.87-2.00 mm; length of mesonotum: 1.55-1.72 mm; width of mesonotum (including tegulae): 2.17-2.35 mm.

General appearance as *C. marginicollis* and *C. sikaniae*, similar in size to the former. Reddish brown in colour with yellow specks.

Vertex (Fig. 13B) trapezoidal, short, broader than long; its surface almost flat, less concave than in *C. marginicollis*. Parabolic anterior margin with faint medial groove. Lateral carinae less elevated than in *C. marginicollis*. Face (Fig. 13A) shorter than in the other two species. Shape of frons as in *C. marginicollis*, but with a more uniform appearance, being less flared in the basal third and narrowing progressively towards the apex with regular margins; lateral carinae less protruding. Medial carina of frons and clypeus resembling that of *C. sikaniae*. In lateral view (Fig. 13C), anterior margin of frons slightly convex. Ocelli nearer to the eye than to the lateral margin of frons.

Pronotum and mesonotum (Fig. 13B) like in *C. marginicollis*, but the pronotal medial carina devel-

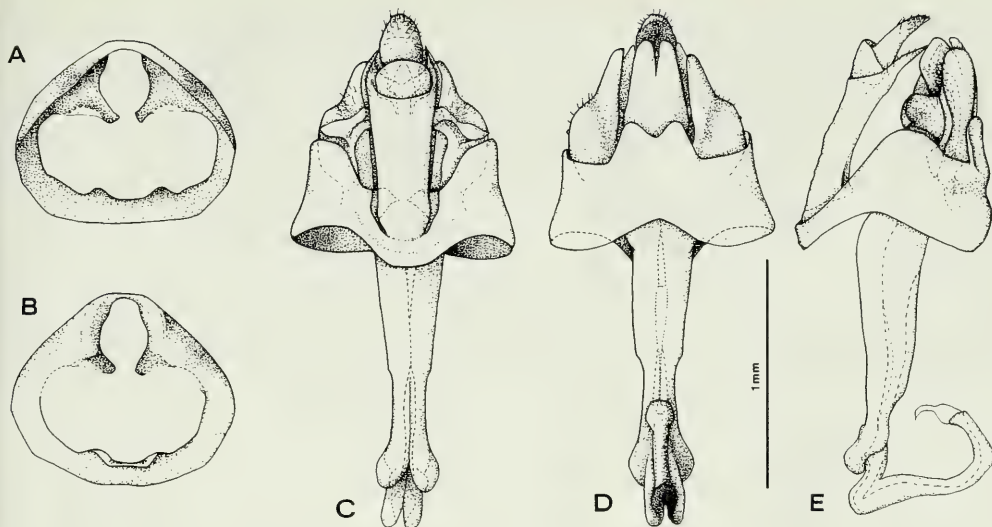


Fig. 14. *Cixidia pilatoi*, spec. nov. ♂ holotype. A-B. Pygofer. A. Anterior, B. posterior view. C-E. Genital block. C. Dorsal, D. ventral, E. lateral view.

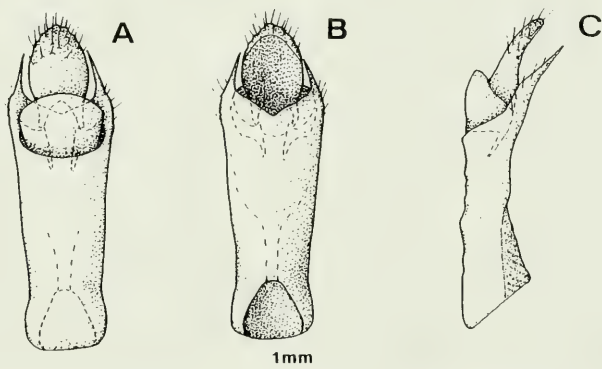


Fig. 15. *Cixidia pilatoi*, spec. nov. ♂ holotype. A-C. Anal tube. A. Dorsal, B. ventral, C. lateral view.

oped along its whole length and the lateral carinae less sinuous.

Colour of head ochre with a scanty evident ochre-brownish band (Fig. 13C) of about the same width as the eye diameter, running from the apex of the head to the tegula, just traced on the pronotum and tegula. Clypeus and lorae presenting faint ochre-brownish markings. Vertex of the same colour as the lateral band, with some yellowish marks.

Pronotum more or less intensely ochre-brownish in colour, lighter in the dorsal portion; carinae somewhat lighter with an ochre band along the lateroventral margins. Mesonotum reddish-brown with slightly lighter carinae and ochre posterior extremity; poorly defined ochre marks at the distal extremities of lateral carinae.

Fore wings very similar to those in *C. marginicollis*, brown, flecked with light ochre, becoming more uniformly brown towards the apex. A yellow spot present on the claval apex. Hind wings brownish-ochre with darker veins.

Legs ochre-brownish. Abdominal segments more or less intensely brown in colour with lighter posterior margins.

♂ genitalia. Genital block (Figs 14A-E) slightly smaller than in *C. marginicollis* but proportionately

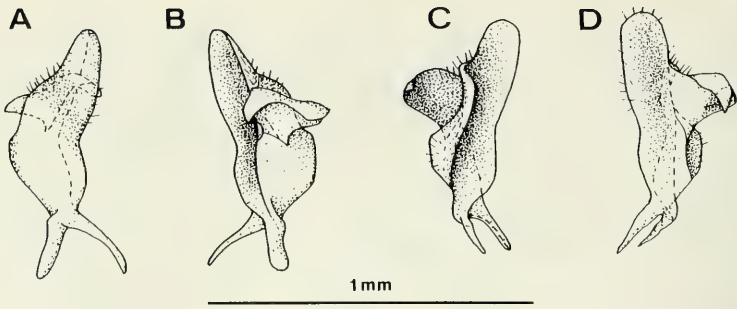


Fig. 16. *Cixidia pilatoi*, spec. nov. ♂ holotype. A-D. Left stylus. A. Ventral, B. dorsal, C. lateral, D. inner view.

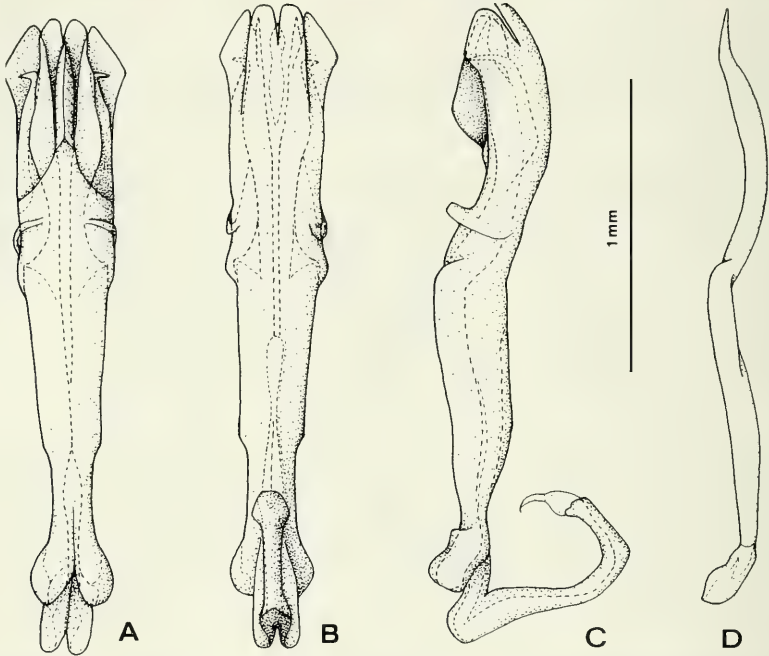


Fig. 17. *Cixidia pilatoi*, spec. nov. ♂ holotype. A-C. Aedeagus. A. Dorsal, B. ventral, C. lateral view. D. ♂ (Lazio, Tuscolo). Penis left rod, lateral view.

larger than in *C. sikaniae*. Pygofer resembling that of *C. marginicollis*, but with subtrapezoidal, broad and short ventral medial lobe (Fig. 14D) with a broader and shallower distal notch and a less prominent notch on the ventral anterior margin. Anal tube thin (Figs 15A-C), with almost parallel lateral margins, imperceptibly broadened in the distal portion, and very long, thin, pointed posterolateral angles. Styli (Figs 16A-D) substantially similar to those of *C. marginicollis* but presenting a narrow ellipsoidal portion; posterior extremity longer and less tapered at the apex. Elongated aedeagus (Figs 17A-C) as in *C. marginicollis* but more slender, in dorsal view with more regular margins, slightly narrowed proximally, but progressively broadening distally. Articular processes of pygofer very developed and prominent dorsally. Lateral lobes as long as, or just shorter than, the ventral ones; similar to those in *C. sikaniae*, albeit smaller, almost quadrangular and somewhat diverging; their inner surface with a very sclerified, long, spine-like process (mammillary in *C. marginicollis* and absent in *C. sikaniae*), bearing a dorsally very bent distal portion and an apex pointing laterally. Ventral lobes like those in *C. sikaniae*, but slightly broader and fused in the proximal $\frac{2}{3}$. Dorsal lobe resembling that of *C. sikaniae*,

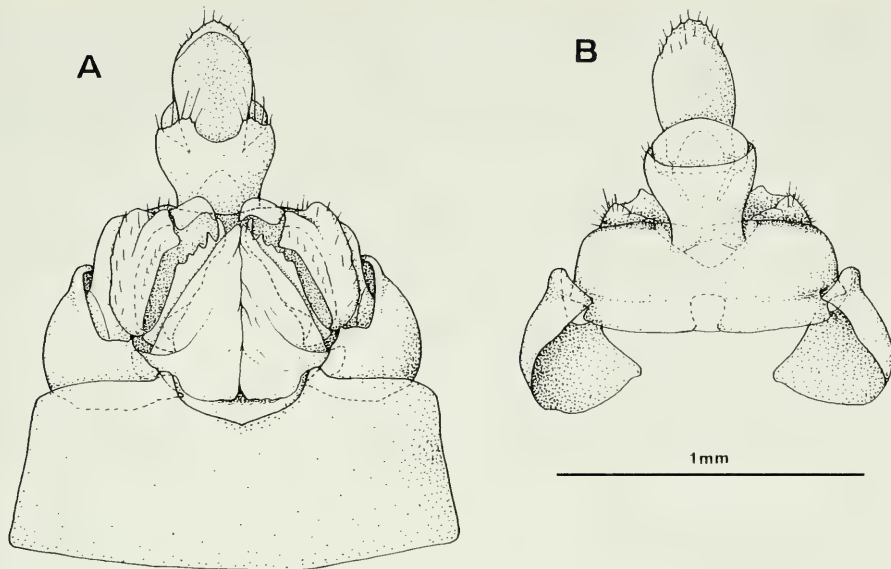


Fig. 18. *Cixidia pilatoi*, spec. nov. ♀ allotype (Tuscany, Tombolo). A-B. Genital block. A. Ventral, B. dorsal view.

but longer. Each rod of penis proper (Fig. 17D) not divided in two branches, with a posteriorly extended spine-like distal portion.

♀ genitalia. Genital block (Figs 18A-B) similar in size to *C. sikaniae*, differing from both previously described species in its proportionately longer VII abdominal sternite, without sinuous lateral margins, on the posterior margin bearing a characteristic notch that is deeper in the medial part, and two small, rounded lobes at the sides of this notch. Teeth of the gonapophysis VIII resembling those present in *C. marginicollis*, but the apical one stronger and more prominent.

Geographical distribution. All records published by Castellani (1953) for Tuscany, Abruzzo, and Lazio as *Helicoptera marginicollis*, and by Servadei (1956, 1960, 1967) for Trentino, Tuscany, Latium, Abruzzo, Apulia, and Calabria as *Helicoptera marginicollis* and *Epiptera marginicollis* refer to this species. Probably, also the specimens reported by Servadei (1956, 1967) for Emilia and defined as *Epiptera marginicollis* refer to this species, although we have not had the opportunity to examine the specimens. As to our knowledge, *C. pilatoi* is present on peninsular Italy, but absent from Sicily. However, signalations of *C. marginicollis* published from South Europe might also refer to *C. pilatoi*, and the distribution area of this species might be much more extended.

Biological and ecological remarks. We have not collected specimens of *C. pilatoi* but they probably share the same way of life and requirements of *C. marginicollis* and *C. sikaniae*.

Derivatio nominis. We dedicate this species to Prof. Giovanni Pilato, esteemed zoologist, friend and teacher.

Discussion

The three species differ not only in their general appearance and size, but also in their colour and pattern, the shape of vertex, frons, and pronotum, and very clearly in the genital morphology of males (ventral lobe of pygofer, anal tube, aedeagus) and females (especially VII sternite). The main distinctive characters are summarized in table 1.

It is not easy to establish relationships between the three species, and those between them and other *Cixidia* species in the Palaearctic region. The species found in Sicily, i.e. *C. marginicollis* and *C. sikaniae*, are very distinct. In fact, they resemble each other only in the shape of the ♀ VII abdominal sternite. Affinities between these two species and *C. pilatoi* are difficult to define, as can be seen in table 1, which shows that they display variously combined characters. Both species from Sicily do not share signif-

Table 1. Summary of the main distinctive characters in *Cixidia marginicollis* (Spinola), *C. sikaniae*, spec. nov., and *C. pilatoï*, spec. nov.

	<i>C. marginicollis</i>	<i>C. sikaniae</i>	<i>C. pilatoï</i>
General appearance of body	small and wide	large and slender	as in <i>marginicollis</i>
Colour	dark brown with yellowish specks	like <i>marginicollis</i> but less intense	reddish-brown with yellowish specks
Head bands	blackish-brown – transverse band at base of frons – transverse band at base of clypeus extending on lorae – wide lateral band running from apex of head to tegula – 2 narrow longitudinal bands on vertex	blackish-brown – absent – absent – 2 bands at side of head, the broader one extends to tegula – 2 narrow bands on the vertex lateral carinae	brown-ochre – absent – absent – band at side of head which can just be perceived running to tegula – absent
Vertex	longer than broad, narrow and concave	as broad as long, less concave	broader than long, flattened
Frons	slender, wide at base	squatter due to a slight distal dilatation; base wide	more regularly tapered at apex; base not so wide
Facial medial carina	very evident, protruding, rounded apically, smoothing out near clypeus	thin, sharper, just outlined on clypeus	as in <i>sikaniae</i>
Pronotal medial portion	subtriangular, narrow, with rounded extremity	trapezoidal and broad	as in <i>marginicollis</i> but wider
Pronotal lateral carinae	sinuous; distal extremities bent externally	straight	as in <i>marginicollis</i> but less sinuous and not so bent
Male genital block size /Body size	large	small	medium
Pygofer ventral lobe	subrectangular, long, with markedly notched apex	subtrapezoidal, long, with faintly notched apex	subtrapezoidal, short, broad, with shallow distal notch
Anal tube	long, thin, with sub-basal narrowing; protruding and pointed posterolateral angles	large, broad, stunted; short, rather rounded, posterolateral angles	long, thin, columnar; very long, thin, pointed, posterolateral angles
Aedeagus	long, with 2 narrowings (proximal and distal) in dorsal view	short, stunted, without narrowings	long, slender; slight proximal narrowing
Periandrial lateral lobes	subtrapezoidal, with a narrow base; little shorter than the ventral ones; with mammillar processes	subtrapezoidal, with wide base; as long as the ventral ones; without processes	subquadrangular, small, diverging; as long as the ventral ones or little shorter; with spine-like processes
Periandrial ventral lobes	broad, fused medially for almost the entire length	narrow; fused only at the base	narrow; fused in the proximal $\frac{2}{3}$
Periandrial dorsal lobe	large, flattened, triangular; slightly sclerified	narrow, short, extended on the sagittal plane; very sclerified	as in <i>sikaniae</i> but longer
Penis rods	forked in 2 spine-like branches	not forked, spoon-shaped subdistal portion	not forked, spine-like
Female seventh abdominal sternum	wide, shallow, medial posterior notch	as in <i>marginicollis</i> but less wide	posterior notch, deep medially, with rounded lobes at its sides

icant characters with any of the species described from outside Italy. However, as to judge from descriptions and especially figures in the literature, *C. pilatoi* likens the specimens from Moldavia (Anufriev, 1969) and Ukraine (Logvinenko, 1975) which these authors erroneously attributed to *C. marginicollis*. Similarities mainly concern the anal tube (narrow, long, columnar with very pointed posterolateral angles) and the aedeagus (in so far as can be deduced from the figures that only show the dorsal view of its distal portion). Generally the pygofer ventral lobe is depicted with a shallower notch than present in *C. pilatoi*. These authors give no information on the ♀ genital structure. As we were not able to examine specimens from Moldavia and Ukraine directly, at present it cannot be established whether they should be attributed to *C. pilatoi*. Since various authors have referred to Anufriev's descriptions (1969) when they identified specimens found in diverse Palaearctic localities as *C. marginicollis*, specimens from those localities should be reexamined to obtain correct diagnosis. There are clear but less evident affinities between *C. pilatoi* and *C. kasparyani* Anufriev, 1983 and *C. mersinica* (Dlabola, 1987). The shape of the anal tube and overall morphology of pieces of the aedeagus of *C. kasparyani* resemble those of *C. pilatoi*, but these two species clearly differ in the orientation of the penis rods, the fine morphology of the periandrial lobes, and the shape of the pygofer ventral lobe. They also present differences in the vertex (shorter than in *C. pilatoi*) and general colour. In addition, the Anatolian species *C. mersinica* loosely resembles *C. pilatoi* in overall aedeagus and anal tube morphology, but differs in the fine structure of the rods of penis proper, lobes of aedeagus, posterolateral angles of anal tube, and median lobe of pygofer.

Anufriev (1969) identifies two subgenera for the Palaearctic species of *Cixidia*: *Cixidia* s.str. (type species: *Cixius confinis* Zett.) and *Epiptera* Metcalf, 1922 (type species: *Flata opaca* Say). The two subgenera are separated on the basis of the following characters: *Cixidia* s. str.: vertex and frons forming an almost right angle; lateral lobes of periandrium without inner processes; apices of penis rods spoon-like; anal tube with noticeable swelling on ventral surface; *Epiptera*: vertex and frons forming an acute angle; lateral lobes of periandrium with inner processes; penis rods at apex not broadened; anal tube without noticeable swelling on ventral surface. *C. pilatoi* and *C. marginicollis* can be included in the subgenus *Epiptera* on the basis of the above-mentioned characters. However, *C. sikaniae* cannot be included in any of the two subgenera. In fact, the angle between vertex and frons, and the anal tube without ventral swelling liken it to *Epiptera*, while the periandrial lobes without inner processes resemble *Cixidia* s. str. Moreover, the penis rods are broadened subapically and not apically. It must be emphasized that also *C. advena* (Spinola, 1839) cannot be included in either of the two subgenera as the components of its aedeagus are so different that they even raise doubts about its belonging to the genus *Cixidia*. These observations suggest that a review of the genus defining the characters and species attributed to it, should precede any separation of subgenera in *Cixidia*.

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References

- Anufriev, G. A. 1969. Studies on some palaearctic Achilidae (Homoptera, Auchenorrhyncha). - Bull. Acad. Pol. Sci. 17: 173-178
- Castellani, O. 1953. Contributo alla conoscenza della fauna emittenterologica d'Italia. Hemiptera Homoptera. - Boll. Ass. Romana Ent. 8: 1-11
- Dlabola, J. 1987. Neue ostmediterrane und iranische Zikadentaxone (Homoptera, Auchenorrhyncha). - Acta Ent. Bohemoslov. 84: 295-312
- D'Urso, V. & A. Guglielmino 1993. Taxonomic remarks on some species of *Cixidia* (Homoptera, Auchenorrhyncha), p. 18 in Drosopoulos, Petrakis, Claridge, & de Vrijer (Ed.): Proceedings of the 8th Auchenorrhyncha Congress. 112 pp. Delphi

- Logvinenko, V. N. 1975. Fulgoroidea. In *Fauna Ukrainy* 20: 1-287, Kyiv
- Metcalf, Z. P. 1948. *General Catalogue of the Hemiptera*. IV. Fulgoroidea. 10. Achilidae. 85 pp. Northampton
- Servadei, A. 1956. Gli Omotteri (Hemiptera Homoptera Auchenorrhyncha) del promontorio garganico. - *Mem. Biogeogr. Adriatica* 3: 196-243
- 1960. Gli Omotteri (Hemiptera Homoptera Auchenorrhyncha) della Calabria. - *Mem. Mus. civ. Stor. nat. Verona* 8: 301-333
- 1967. Rhynchota (Heteroptera, Homoptera Auchenorrhyncha). *Catalogo topografico e sinonimico. Fauna d'Italia* 9: 1-851, Bologna
- Spinola, M. 1839. Essai sur les Fulgorelles, sous-tribu de la tribu des Cicadaïres, ordre des Rhyngotes. - *Ann. Soc. ent. Fr.* 8: 133-337
- Wagner, W. 1959. Ueber neue und schon bekannte Zikadenarten aus Italien (Hemiptera-Homoptera). - *Fragm. Ent.* 3: 67-86